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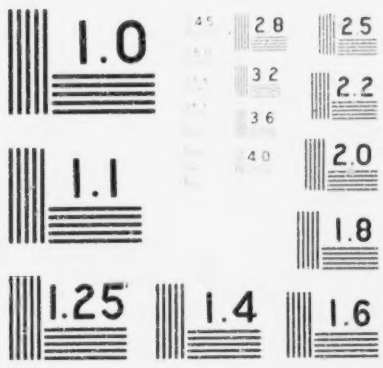

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THE CONCEPTS OF KNOWLEDGE OF PEIRCE AND DEWEY--THE RELATION TO EDUCATION.

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A RATIONALE AND A THEORETICAL SKETCH WERE DEVELOPED FOR EMPLOYING A PRAGMATISM DERIVED DIRECTLY FROM THE WORK OF CHARLES PEIRCE AS A PRIMARY CRITICAL TOOL FOR EDUCATIONAL PHILOSOPHY. TO THIS END, THE AUTHOR SUMMARIZED THE PRINCIPAL EPISTEMOLOGICAL CONCEPTS OF PRAGMATISM AND OF ITS OFFSPRING, DEWEY'S EXPERIMENTALISM. HE ALSO APPRAISED BRIEFLY THE MAJOR DIFFERENCES OF PEIRCE'S SEMINAL THEORY AND DEWEY'S ADAPTATIONS THAT INFLUENCED LATER DEVELOPMENTS IN EDUCATIONAL THEORY. FINALLY, HE POSITED A CONCORDANCE BETWEEN PRAGMATIC EPISTEMOLOGY AND COGNITIVE CONSISTENCY THEORIES AS ILLUSTRATIVE OF ONE OF SEVERAL DIMENSIONS ALONG WHICH CONTINUING STUDY COULD PROCEED. (JH)

THE CONCEPTS OF KNOWLEDGE OF PEIRCE AND DEWEY: THE RELATION TO EDUCATION

Project No. 6-8230
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Ted L. Cooper

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Stanford, California

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1. INTRODUCTION

1.1 The rationale of this study rests upon four assumptions, the first three well evidenced, the fourth a hypothesis which is the principal focus of the study: (i) society necessarily practices education; (ii) knowledge performs a central role in education, and a concept of knowledge is essential to a concept of education; (iii) American education has been significantly influenced by the thought of John Dewey, and Dewey derived central concepts of his thought from the work of Charles Peirce; (iv) Peirce's original pragmatism may provide some useful concepts with which to approach current educational questions.

1.11 As Jaeger tells us, in his Paideia, "Every nation which has reached a certain stage of development is instinctively impelled to practise education" (16: xiii). In fact, as anthropological findings show, every society in its origins is impelled to practice education in some more or less formal way, for a fundamental purpose of education is to develop in oncoming generations the knowledge necessary that culture, in the anthropologists' sense, may be conserved and that society, as the organization of interpersonal relations and of the activities necessary to human life, may satisfy the needs and the desires of its constituents.

1.12 Few readers would quarrel with the foregoing as an approximation of the central role of knowledge in the educational process. Knowledge is the medium, as education is the means, of enculturation and socialization, and the very stuff of individual skill, concept, and attitude formation. If this general proposition is granted, then it follows that a concept of knowledge, implicit or explicit, is prerequisite to or a necessary constituent of any concept of education. How one conceives the nature of knowledge will (in large part) determine how he will conceive the shape and content of education.

> If one is a radical 'realist', one will believe that there is a world with a structure there to be known . . . . Learning will be a kind of conforming of oneself to what is.
>
> . . . . . .
>
> If knowing is identified with activity, as it is by the pragmatists . . . a central stress of education will naturally be laid upon 'activity methods' (in the widest sense). Experiment, discovery, problem-solving, will be knowledge in action (23: 33f).

These abbreviated examples represent, I think not unfairly, the dominant epistemological influences on the shape of American

education.

The realist position is characteristic of the twenty-five centuries old Western tradition; to assert 'that X knows that Q' commits us "also to asserting, or taking it as true, that Q" (26: 22; see also 25: chaps, XII, XIII, in which Russell summarizes the traditonal conceptions of knowledge and truth).

The pragmatic position, less than a century old, emphasizes knowing as process; to assert 'that X knows that Q' is to ascribe to X an attitude,belief, opinion, or behavioral disposition relative to Q. Of this knowing process, Charles Peirce said, "The most that can be maintained is, that we seek for a belief that we shall think to be true" (5.375)*.

Anglo-American philosophy still widely subscribes to the traditonal condition on knowledge, and the influence of this view is discernible in much recent educational theory and criticism. The pragmatic conception, though less widely and well established, discernibly has influenced American educational theory, most notably through Dewey's work.

1.13 Dewey's experimentalism is characterized by Dworkin as the consequence of

> The coming together . . . of the evolutionary approach in the natural sciences, experimental method in the social sciences, and pragmatism in philosophy--in a world of technological transformation and in an atmosphere of social and political reformism (12: 7f).

Dewey responded to the rising, reformist Progressive movement by constructing a theoretical equivalent of it, "moving from the more restrictively philosophical enterprises" of James and Peirce to emphasize social purposes as the focus of philosophical theory (12: 6). By 1916, in his Democracy and Education, Dewey equated philosophy and educational theory (7: 328). This equation of theoretical and judgmental activities became a significant characteristic of the Progressive Education movement rallied under the banner of Dewey's experimentalism.

Dewey and the Progressive Education movement effected a transformation in the schools "in many ways as irreversible as

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*All references to Peirce's original work (23) will observe the established convention of citation: volume number, decimal point, paragraph number. The reference number of the present paper will be omitted.

the larger industrial transformation of which [they were] a part" (5: 353). They shifted the principal focus of educational attention from the learning to the learner, from the subject matter to the student. But in the decade following World War II the Progressive Education Association--the core of the movement--collapsed, and Dewey's influence declined as a new constellation of philosophic interests acceded to dominance: the logical analytic "school" largely generated by Russell and Wittgenstein, the emerging linguistic analytic interest, the existentialist revolt, and the revival of interest in Charles Peirce.

1.14 Though William James and Dewey were the dominant American pragmatists for three decades, and central influences on American philosophy, with the publication in 1931 of the first volume of The Collected Papers of Charles Sander Peirce (23), the attention of the philosophic community turned to the neglected work of the progenitor of pragmatism. In 1946 the Charles S. Peirce Society was established. In the past two decades a substantial interpretive literature has appeared, some principal items of which appear in the reference list of this study. Peirce became, in many minds, the dominant American philosopher.

> If philosophical eminence were measured . . . by the extent to which a man brought forth new and fruitful ideas of radical importance then Charles S. Peirce . . . would be easily the greatest figure in American philosophy. . . . Few are the genuine contributions of America to philosophy of which the germinal idea is not to be found in some of his stray papers (4: 268).

Peirce introduced into philosophy a radically new concept of knowledge which, unlike his contributions to logic, has yet to take its full effect on our theoretical speculations. Trained as a mathematician, experienced as a scientific observer, Peirce constructed in his pragmatism a distinctively methodological conception of those functions--knowing, meaning, communicating--that are the defining conditions of intellectual activity. Dewey adapted Peirce's pragmatism to the service of his social philosophy and educational theory, with, as Cremin noted, probably irreversible effects on American education. Thus the foundation of the pragmatic influence on American education is to be found in Peirce.

1.15 A substantial literature now exists to interpret Peirce and Dewey. Max Fisch's "Draft of a Bibliography of Writings About C. S. Peirce" comprises twenty-nine closely printed large octavo pages (21: 486-514). An equally impressive and more familiar commentary on Dewey is available. Perhaps the most accessible critique of Peirce's thought is Gallie's excellent

Peirce and Pragmatism (14). The best single overview of Dewey's work is, I think, Geiger's (15). Dewey's educational ideas have been criticized, interpreted, and not infrequently mangled beyond recognition--a problem noted by responsible commentators and by Dewey himself. Relatively little attention has been given to the possible relation of Peirce's thought to educational theory. Eisele's recent paper, though limited in source and scope, is excellent (21: 51-75). Maccia's several papers (17, 18, 19) of a decade past are less satisfactory. I have not found published the kind of study proposed here.

1.2 Having assumed that a concept of knowledge is a necessary condition of a concept of education, I will focus my study on selected central conceptions in Peirce's and Dewey's epistemologies, to the end that I may make a critical appraisal of the relative importance of these two pragmatist thinkers with respect to current educational questions.

1.21 I will compare Peirce's and Dewey's central epistemological conceptions as a means to assess the strengths and weaknesses of the former.

1.22 I will comment on perceived relations between Peirce's concepts and some recent and current behavioral research and theory.

1.23 I will seek to infer how a reinterpreted pragmatism --in the Peircean line--may contribute to our present thinking on educational theoretic questions.

2. THE PRAGMATIC CONCEPT

2.1 The problem of knowledge has attracted man's curiosity at least since he began systematically to record his thoughts on the nature of his universe. As I noted above, one concept of knowledge has dominated Western thought. This is broadly the case, whether the paradigm of knowledge is the rationalistic model, mathematics, or the empiricistic model, natural science.

The Western tradition has conceived knowledge principally in the abstract--that is, not as someone's knowledge, a dependent behavioral characteristic, but as a character, faculty, property, or quality in itself, whether of men, of some other posited being, or of the universe. In Charles Peirce's pragmatism a radically new conception of knowledge challenged the tradition.

Peirce did not deny the tradition, but reoriented it (e.g.,

see 5.142, on logical and material truth) and transcended its limitations to recognize two principal characteristics of human knowledge, that it is fallible and that it is an essentially evaluative, behavioral process. "Not only is our knowledge . . . limited in scope," said Peirce, "but it is even more important that we should thoroughly realize that the very best of what we, humanly speaking, know [we know] only in an uncertain and inexact way" (5.587). And further, "all our knowledge rests upon perceptual judgments" (5.142).

The behavioral orientation of pragmatism--its most important feature, I think--is clearly signalled in Peirce's characterization of the truth of propositions, a characterization very different from the traditional view. For Peirce the truth of a proposition consists in the correlation of belief in the proposition with a disposition to act in a manner that satisfies the conditions of the proposition (5.375n; see also, 5.438, on meaning or the purport of symbols).

Pragmatism as conceived by Peirce is a method of inquiry, "of ascertaining the meaning of hard words and of abstract concepts" (5.464), especially of "intellectual concepts . . . upon the structure of which, arguments concerning objective fact may hinge" (5.467). But 'objective fact' does not here refer us to any truth of things in the traditional sense, as Peirce elsewhere made clear: ". . . the sole object of inquiry is the settlement of opinion" (5.375).

Thus Peirce dismissed the traditional supposition that the aim of knowledge is a true opinion, "for as soon as a firm belief is reached we are entirely satisfied, whether the belief be true or false" (5.375).

Though Peirce emphasized the methodological aspect of pragmatism, the behavioral orientation of the concept permeated much of his work and established the general character of the movement which followed after him. This is especially noticeable in Dewey's work, with its persistent emphasis on doing, acting, undergoing consequences.

A consequence of the pragmatic "style" is emphasis in theoretical construction on the process of inquiry and on sign behavior. For Peirce, belief (or knowledge) is the outcome of inquiry. For Dewey, knowing is inquiry.* And for both men, sign

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*This equation is not consistent with all of Dewey's statements (cf. 10: 7-9, which read very like Peirce and include a footnote acknowledging the debt), but the assertion is consistent

behavior is a preeminent consideration in any conceptualization of knowing.

To avoid the confusion--my own, if not the reader's--possible in the presentation of two closely related but differing positions, I will first summarize each, then make a critical appraisal of their significant differences. The summaries given here are neither mere paraphrases of nor competitors with the existing commentaries. They represent a selection, relevant to certain central conceptions--of experience, belief, doubt, inquiry, inference, and signs--that form the foundation of pragmatism, provide a frame of reference for comparison of Peirce's and Dewey's position, and may be inferentially related to some current educational questions.

2.2 These central concepts, which largely constitute Peirce's theory of knowledge, appear in his work in three distinctive terminologies, each peculiarly suited to express a distinctive aspect of the knowing process. These differing but intimately related perspectives can be usefully organized under three subheads--the conception of inquiry, the conception of inference, and the conception of signs (after Gallie, 14: 84f). The conception of inquiry subsumes, virtually as definientia, the conceptions of experience, belief, and doubt, in a somewhat psychological perspective. The conception of inference focuses on the methodological aspects of knowing, taking the physical sciences as an operational paradigm. The conception of signs is, perhaps, not strictly a constituent of Peirce's theory of knowledge, but its most important corollary, the consequence of Peirce's contention that "every thought is a sign" (5.253).

2.21 Peirce roughly formulated and named pragmatism about 1870-71 in a brief paper for the Metaphysical Club at Harvard. This first version became the basis for the now standard introductory papers of 1877 and 1878 (5.358ff, 5.388ff). But as the theory generated a movement, Peirce felt that his label was being misapplied (5.414). He coined 'pragmaticism' to distinguish his original conception from that of James and from popular pragmatism, to protect his conception from the too narrowly "practical" interpretation others made of it.* overpage

The 1878 version of the pragmatic maxim reads: "Consider

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with Dewey's "last words" on the subject: 'inquiry' is "an equivalent of knowing, but preferable as a name because of it freedom from 'mentalistic' associations" (11: 295). Note that Dewey and Bentley distinguish 'knowledge' from 'knowing' and equate the latter with 'inquiry.'

what effects, that might conceivably have practical bearings, we conceive the object of our conception to have. Then, our conception of those effects is the whole of our conception of the object" (5.402). In 1905 Peirce restated the maxim "in the indicative mood," to minimize the risk of misreading: "The entire intellectual purport of any symbol consists in the total of all general modes of rational conduct which, conditionally upon all the possible different circumstances and desires, would ensue upon the acceptance of the symbol" (5.438). The following year he wrote an explanatory note on the original version of the maxim, to counter the mischievous effects of the term 'practical bearings.' The use in the maxim, he said, of five derivatives of 'concipere' was intended "to show that I was speaking of meaning in no other sense than that of intellectual purport." Pragmatism does make "thought ultimately apply to action exclusively--to conceived action." But this is not equivalent to saying that thought consists in acts or that the sole purpose of thinking is action. Rather, pragmatism "makes thinking to consist in the living inferential metaboly of symbols whose purport lies in conditional general resolutions to act." (5.402n) That is, pragmatism makes thinking to consist in the inferential metamorphosis of experience into beliefs. Pragmatism is a conceptualization of that process in which we derive our beliefs, which constitute our habits of action, reaction, and expectation.

2.3 The core of Peirce's conception of knowledge, or knowing, is his conception of the character and mutual relations of belief, doubt, and inquiry. And the foundation of his conception of these is his conception of experience, expressed in terms of his critical commonsensism:**

> The idea of the word "experience" was to refer to that which is forced upon a man's recognition, will-he-nill-he, and shapes his thoughts to something quite different from what [without that experience] they would have been (5.613).

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*Since 'pragmaticism' is somewhat awkward, and appears only quite late in Peirce's work, I will use the better established 'pragmatism,' to be understood here as designating Peirce's theory.

**The doctrine of critical commonsensism consists in Peirce's contention "that we must commence philosophy, like every other branch of inquiry, from an examination of our relevant commonsense beliefs, and then subject these to that general line of criticism --'fallibilism' Peirce calls it--which the example of the most successful sciences suggests" (14: 85). The doctrine is explicated in the Collected Papers, vol. V, bk. III, ch. 3.

Or more briefly put, "experience means nothing but just that of a cognitive nature which the history of our lives has forced upon us" (5.539).

2.31 Experience, on Peirce's analysis, eventuates in one of two interrelated conditions of mind, belief or doubt. In the first case experience is, on reflection, seen to be assimilable to the existing belief set. Belief is the necessary condition of our usual volitional behavior. In the second case experience is seen to be incongruent with existing belief. Doubt is the necessary condition of inquiry.

Peirce held that "there may be no intelligent beings" without beliefs, which proposition put the other way around implies that the usual or predominant condition of intelligent beings is belief (5.318). The condition is characterized by three properties: we are aware of it, it satisfies doubt, and "it involves the establishment in our nature of a rule of action, or, say for short, a habit" (5.397).

Habit is the essential character of belief. A belief-habit "puts us into such a condition that we shall behave in some certain way, when the [relevant] occasion arises" (5.373). A belief-habit arises from successive similar experiences. This succession brings us to expect its continuance, that is, to expect our past and future experience to be consonant. In short, "our idea of anything is our idea of its sensible effects" (5.401).

Beliefs may be distinguished as practical and theoretical. A practical belief is instrumental, in the direct sense, as, that anthracite is a convenient fuel. "A practical belief may . . . be described as a habit of deliberate behavior" (5.538). But deliberate behavior has complex origins; "habits are sometimes acquired without any previous reactions that are externally manifest" (5.538). We may imagine a stimulus, and in imagination derive a (seemingly) appropriate reaction. And this process will result equally in habit, provided that the imaginative reaction is sufficiently internalized.

Theoretical belief stands further removed from practice, though "every proposition that is not pure metaphysical jargon and chatter must have some possible bearing on practice" (5.539). The bearing of theoretical belief on practice is exemplified, in strict form, in the relation of statistical tests of significance to predictive judgments.

Insofar as theoretical belief is not expectative in the strict sense, it is expectative in a residual sense. For example, belief in the efficacy of the holy sacrament is an expectation of

an effect in the future, a contingent future the realization of which in part rests on the efficacy of the sacrament. "Thus, . . . even in regard to so excessively metaphysical a matter, the belief, if there can be any belief, has to involve expectation as its very essence" (5.541). And an expectation, whether of the statistical or metaphysical sort, is a habit. In short, knowledge consists in our expectative habits with respect to experience.*

If belief is the source of our dispositions and behavior, it must have some corrective source with respect to our experience. This corrective is doubt. We all as children acquire a great many beliefs, largely quite uncritically. As we mature we increasingly encounter novelties in our environment, incongruent with our beliefs. We then doubt. We may doubt the accuracy of our perceptual judgments or we may doubt the validity of our beliefs, but the essence of the situation is doubt, "an uneasy and dissatisfied state from which we struggle to free ourselves and pass [again] into the state of belief" (5.372).

Doubt may arise from some novelty of experience or from the conscious exploration of alternatives, as in scientific experiment. "However doubt may originate, it stimulates the mind to an activity which may be slight or energetic, calm or turbulent" in proportion to the significance of the incongruity between expectation and experience (5.394).

2.32 The activity generated by doubt Peirce named 'inquiry' (5.374). The outcome of inquiry, if it is not aborted, is belief. But the opinion so to be settled is not that merely of any individual. What shall be cognized as real and what illusion must meet a public criterion. Therefore, the satisfaction of doubt requires a method "such that the ultimate conclusion of every may shall be the same. . . . Or would be the same if inquiry were sufficiently persisted in" (5.384 and n). This criterion on inquiry is the corollary of Peirce's conception of truth, "that truth's independence of individual opinions is due (so far as there is any 'truth') to its being the predestined result to which sufficient inquiry would ultimately lead" (5.494).

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*Peirce made the distinction between practical and theoretical belief to consist in the involvement of "purpose [or] effort; namely that the former is expectant of muscular sensation, the latter of sensation not muscular" (5.540). Perhaps a more serviceable distinction can be achieved holding the distinction to consist in the extensional expectation of practical belief and the intensional expectation of theoretical belief.

Now all our beliefs demonstrably do not satisfy this rigorous criterion. Very many of our beliefs are acquired by commoner methods which Peirce named the method of tenacity, the method of authority, and agreeableness to reason (5.377-387).

Human society demonstrably depends upon a substantial community of belief; the greater number at least of our public doubts must be satisfied. The commoner methods of fixing belief has each a flaw which must in the long run abort the outcome, though in the short run these methods are serviceable. For the critical cases we require a method of inquiry "by which our beliefs may be determined . . . by something upon which our [mere] thinking has no effect" (5.384). The method of science, Peirce held, meets the criterion. Its fundamental hypothesis is that there are real things, independent of our opinion; those reals affect our senses according to discoverable principles; and, though our individual sensations differ as do our relations to things, yet by means of the discoverable principles we may achieve a community of opinion.

2.4 Peirce's ground for taking scientific inquiry as paradigmatic of purposeful thinking is that this mode of inquiry conforms to the laws of inference, to the traditional laws of deduction and induction, and to a third order of law, the logic of hypothesis, which Peirce named 'abduction.'

Peirce modified the traditional conceptions of deduction and induction. He insisted that, though the conclusion of a deduction is contained in the premises, the procedure does often comprise an observational or even an experimental element. Of induction he noted that it is primarily a <u>testing</u> method, a method for assembling fair samples as the basis for fair judgments, not a method for originating knowledge. (14: 95f).

2.41 The distinction of the types of inference turns on the relation of rule, case, and result. "Deduction proceeds from Rule and Case to Result," induction "from Case and Result to Rule," abduction "from Rule and Result to Case" (2.712). The conclusions of hypothetic (abductive) inference cannot be derived inductively; they are "not susceptible of direct observation in single cases," since it is the case that we infer. Conversely, the conclusions of inductive inference cannot be derived hypothetically, "on account of their generality." So we inductively infer the law (or rule) of gravitation. Hypothesis might give the same conclusion for a particular case, "but it never could show that the law was universal" (2,714).

The form of hypothesis is given by the following schema:

The surprising fact, C, is observed;
But if A were true, C would be a matter of course,
Hence, there is reason to suspect that A is true (5.189).

The schema presents two features of hypothesis that represent its principal importance. First, the conclusion of a hypothetic inference is tentative and contingent. A hypothesis opens a new line of thought; it is the distinctively creative form of inference. Second, a hypothetic inference is only one step toward belief. Pragmatism, taken as an exposition on the admissibility of hypotheses, "requires that every genuine hypothesis shall be such that there can be deduced from it consequences which can be tested inductively, i.e., experimentally" (14: 99).

Now we may understand Peirce's conceiving inference as the essential cognitive function. Hypothesis serves to interpret (recognize) experience; deduction serves to project consequences; induction serves to generalize, i.e., to test the range of applicability of cognitions. All purposive thought, Peirce held, follows the same pattern--the interdependent interaction of the three types of inference. That is, purposive thought consists in the formation and exercise of habits of inference.

2.42 Inferences may be further classified as to the degree of deliberateness of control. Reasonings are our most deliberate and controlled inferences, in which the relevant premises and applicable principles are consciously present. Acritical inferences are a more everyday sort, in which the premises and principles are not (usually, or largely) explicit. (5.440) The third class are "logically exactly analogous to inferences excepting only that they are unconscious and therefore uncontrollable and therefore not subject to criticism" (5.108). The paradigm of the third class is perceptual judgment--e.g., of color, shape, number, and spatial and temporal relations.

The essential feature of Peirce's conception of inference is habit, that is, consistent patterns of inference. But if our knowledge is the outcome of habits of inference, and there are no indubitable factual first premises, as Peirce insisted, what is the connection between the "hard facts" of experience and our knowledge? Peirce answered that perceptual judgments, though logically analogous to hypotheses, function as uninferred premises, since the prior premises and principles upon which perceptual judgments depend are unconscious in the action of perception.

2.43 The explicit intent of Peirce's conception is that all our inferences are fallible. Our perceptual judgments and acritical inferences are notoriously fallible. A deductive proof, however formally correct, may be fallible because the warrant of

its conclusion requires, in addition to the explicit premises, further premises so habitual that we fail to make them explicit. Induction at most achieves a high probability of the validity of its conclusion. And hypothesis, since it is neither general nor necessary, is essentially fallible.

Peirce's analysis of inference is not a description of any felt or postulated mental process; it is a conception of the fact of cognitive processes--that we do make assertions, for which we do offer warrants, which warrants we (usually) intend to be such that their expression could persuade other men to the same conclusion. This conception led Peirce to assert that "all thought whatsoever is a sign, and is mostly of the nature of language" (5.421). That is, thought is essentially communication.

2.5 Peirce's sign theory is not strictly necessary to his pragmatism, which can be taken as a logical rule related to the conceptions of inquiry and inference. But much of the richness of Peirce's thought, his creative and largely independent construction of pragmatism as a general philosophic frame of reference, would thereby be lost, as would some of the relation to Dewey's later sign theory. Peirce's conception of signs is extraordinarily complex. I will limit my exposition to its principal general features.

2.51 Peirce's primary intent was to discover and formulate a common property or characteristic of signs that should serve as the logical differentia of all sign-behavior. The unique characteristic he posited is triadic structure; a sign (i) stands for an object (ii) to an interpretant (iii). This formulation violates our common-sensical, and traditional philosophical, disposition to conceive the sign-object relation as dyadic. But consider the fact (or event) expressed by 'A give B to C.' This can not be expressed dyadically, since 'gives to' presumes a giver, a given, and a receiver; the action expressed is irreducibly triadic. And the consideration holds for events expressed in the more general form 'A signifies B to C.' Nor is the argument aborted by apparently dyadic expressions--'A means B'; 'C conceives A'--since these, if they are meaningful, likely are elliptical for 'A means B to C' and 'C conceives A as B.' (after 14: 116).

The insight exhibited in the postulate of triadic structure is so common-sensical, once stated, one wonders that this whole line of thought did not appear very much earlier than it did. We infer the existence of a mind principally from certain behavior--the use of and response to signs. That is, we infer thought from the evidence of action (including the action of reporting a disposition to act). Or to take Peirce's judgment,

". . . just as we say that a body is in motion, and not that motion is in a body we ought to say that we are in thought and not that thoughts are in us" (5.289n).

2.52 A further characteristic of signs stressed by Peirce is that an interpretant always stands in the same triadic relation to the object as does the original sign. That is, the interpretant (at least potentially) always stands as a sign to a further interpretant. The point here is not to postulate a necessary infinite progression, which Peirce recognized is absurd (1.541 passim). Rather, he called attention to the capacity of signs to generate relations, and to generate alternative relations. Thus a given sign may generate alternatively an emotional interpretant, a logical interpretant, or a habit change either of association or dissociation (5.475f). And since no two persons have identical experience, the generative capacity of a given sign is theoretically infinite. Conversely, every sign is essentially incomplete.

2.53 In short, Peirce saw in signs a characteristic concordant with the fallibilism he posited of inferences; "in general every sign in a phase in a conversation to which there can be no necessarily last term" (14: 127).

Suppose a farmer, an agronomist, and a grain buyer stand together looking across the farmer's acres of growing wheat. Without belaboring the details, one could assume that the three men's perceptions would differ, consistently with their different backgrounds and intentions. The men's perceptions stand as signs which, supposing they have gathered to discuss or decide some matter, will be interpreted in further signs, which they will express to one another. These expressed interpretants will likely vary widely among the men. It is no mere fiction to suppose that their cognitions might be mutually exclusive.

Peirce insistently maintained that common-sensical examples like the foregoing, if sufficiently elaborated from rigorous observation, would quite adequately exhibit the principal features he posited of thought processes and sign-behaviors. My illustrative trio come together, each with well-established habits of cognition and perception, each with well-established particular interests. The perceptual judgments they make, the cognitions they derive, and the conversation and actions those cognitions admit of will likely exhibit (theoretically) predictable differences that may be adequately accounted for on the pragmatic model.

2.6 The behavioral orientation of Peirce's thought derived in part, certainly, from his very wide study in the

physical and behavioral sciences, but also in part from the historical accident of his birth date. As he commented, he was "about 21 when the Origin of Species appeared" (5.64). The implications for philosophy of the evolutionary concept appear throughout his work. As a result of his scientific studies and his acceptance of the evolutionary concept (as he understood it), Peirce took thought and communication as essentially adaptive characteristics of human behavior (5.433).*

The whole direction of Peirce's work, including the technical by-ways he explored, is to construct a philosophy of human behavior, a broad philosophical psychology.

While there may be--I would say there are--normative implications in Peirce's pragmatism, his intent clearly was to construct a set of concepts of our most important conscious adaptive characteristics: our knowledge, our means to it, and the principal vehicle of it. "This conception of knowledge and inquiry [and sign-behavior], when viewed as a systematic whole constitutes one of the most impressive of American contributions to philosophy" (28: 93). It is a rigorous conception, constantly referred back to the observable characteristics of human behavior from which the conceptions were inferred.

Peirce's thought was parent to many of the most familiar features of Dewey's philosophy, to which I now will turn.

Comment. The following sections of this report will be necessarily only sketches of my intentions for the completed thesis. Because my preferred working style is sequential, not concurrent, and because my study has been unavoidably interrupted by other demands on my time, the analysis of Dewey's thought, the comparative appraisal with Peirce, and further comments exist only in quite rough form. Therefore, sections 3, 4, and 5 will be of the order of extended sentence outlines, lacking the detail of sections 1 and 2.

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*The relation of the evolutionary concept to Peirce's thought is not unambiguous. I will comment on this matter in section 5.

3. THE EXPERIMENTALIST CONCEPT

3.1 The selective summary here of Dewey's epistemological conceptions is intended to provide a critical bridge from pragmatism "proper" (that is, Peirce's) to educational theory. I will discuss those aspects of Dewey's thought that are most nearly equivalent to the central conceptions of Peirce's pragmatism. The equivalences are not exact, of course, but the matter of principal interest are the differences within the similarities of pragmatist and experimentalist epistemology.

3.2 Dewey's conception of experience is at once, similarly to Peirce's, commonsensist and, dissimilarly, particularized by Dewey's postulation of two pervasive characteristics of experience. Experience is not only or largely or even most importantly intellectual; experience is the pervasive characteristic of "the interaction of live creature and environing conditions . . . involved in the very process of living" (6: 35). Experience is "had" before it is cognized. ". . . the theory that all experience is a mode of knowing . . . . goes contrary to the facts of what is primarily experienced." (9: 21)

3.21 From such considerations Dewey derived the two postulated characteristics of experience, which are central to his entire conception. First, he postulated that experience is "transactional." The intent of this term is to call attention to the continuity of experience, "to the effect that there are units [of experience] which can of course be broken apart for purposes of analysis but not for any other reason" (15: 16). The commoner word, 'interaction,' Dewey held, "is undoubtedly the source of much of the more serious difficulty in discussion" of knowing and knowns (11: 296). The term "already has begged the question of continuity, for it assumes that some things have indeed been set apart, the problem now being to put them together again" (15: 16).

The transactional concept is taken from the model of commerce--buying-selling, lending-borrowing. It is equally appropriate to a wide range of similarly logically paired relations--parent-child, husband-wife, means-ends--that are characterized by continuity, the feature of experience Dewey stressed (15: 16f).

3.22 Second, Dewey distinguished experience "at large" and singular experience. Generic experience is often inchoate, ambiguous, or aborted.

> In contrast . . . we have an experience when the material experienced runs its course to fulfillment. . . . A piece of work is finished . . . ; a problem receives its solution; a

> situation . . . is so rounded out that its close is a consummation and not a cessation. Such an experience is a whole and carries with it its own individualizing quality and self-sufficiency. It is an experience (6: 35).

This "individualizing quality" of an experience is a felt unity, pervasive despite variations in the constituent elements of the experience. I say the unity is "felt" because Dewey's conception seems more pervasive than alternative adjectives--e.g., 'existential,' 'affective'--usually are taken to admit. That pervasive, felt unity, Dewey held, is esthetic quality; ". . . an experience . . . has its own esthetic quality. It differs from those experiences that are acknowledged to be esthetic, but only in its materials" (6: 38, italics added).

Though I here give only the barest outline of Dewey's conception of experience, and the corollary conceptions of the transactional and esthetic character of experience, the importance of these concepts for Dewey's thought is maximal. As Geiger noted, "'experience' is the very signature of Dewey's philosophy" (15: 19). And the transactional character of experience is the leitmotiv of Dewey's experimentalism.

3.3 The conception of knowledge to which Dewey's career brought him was, as I noted earlier, in some respects similar to Peirce's. The opening chapter of the Logic (10) uses 'knowledge,' 'belief,' 'doubt,' 'inquiry' in ways already familiar in Peirce. Dewey commented, "The readers who are acquainted with the logical writings of Peirce will note my great indebtedness to him in the general position taken" (10: 9n). And the general position with respect to the meaning and the relations of the epistemological vocabulary is very like Peirce, in much of Dewey's writing. But in the paragraph to which the acknowledgment above is a footnote Dewey already exhibits the differences of his position.

"Knowledge, as an abstract term," Dewey said, "is a name for the product of competent inquiries." But this product is not fixed or absolute. Knowledge is the outcome of inquiry into experience; experience is ongoing, a continuum; inquiry is therefore "a continuous process in every field with which it is engaged." (10: 8) And because the knowledge situation is thus fluid and only temporarily settled, "the term 'warranted assertion' is preferred to the terms belief and knowledge" (10: 9). The word 'belief,' even more than the word 'knowledge,' suffers from a historically engendered ambiguity now irreversibly habituated in our language, Dewey held.

Dewey was so concerned to avoid in his position the now inherent ambiguity of the word 'knowledge,' that he finally was

not satisfied even to substitute 'knowing.' In his last book he nominated 'inquiry' as the generic epistemological term. "It is an equivalent of knowing," he said, "but preferable as a name because of its freedom from 'mentalistic' associations" (11: 295). It is "a strictly transactional name," he held.

This and similar assertions about other items in the "trial group of names" in Knowing and the Known demonstrate the centrality of the transactional concept to Dewey's thought. In Knowing he proposes 'transaction' as a name for "the knowing-known taken as one process" (11: 304). He identifies 'transaction' with "doings, proceedings, dealings," and 'interaction' with (ideally) "reciprocal action or influence of persons or things on each other" (11: 306n). Elsewhere, especially in the discussion of interaction and transaction (11: 103-118), the notion of reciprocity seems in some sense also attached to transaction. Admittedly, the discussion focuses analytically on naming-knowing and named-known as aspects of fact.

If we turn to the Logic, as perhaps the final systematic theoretical development of Dewey's career, we find the following definition of inquiry:

> Inquiry is the controlled or directed transformation of an indeterminate situation into one that is so determinate in its constituent distinctions and relations as to convert the elements of the original situation into a unified whole (10: 104f).

Competent inquiry, under this formulation, results in "the establishment of an objectively unified existential situation" (10: 105).

3.31 For Peirce's conception of novelty or surprise as a condition of inquiry, Dewey substitutes the concept of the indeterminate situation. Dewey's concept is more inclusive than Peirce's, consistent with his special postulations on the character of experience. The indeterminate situation is "in terms of actuality instead of potentiality . . . uncertain, unsettled, disturbed." But it is not merely these; it is "uniquely qualified in its very indeterminateness . . . . which makes that situation to be just and only the situation it is" (10: 105).

The indeterminateness of the situation consists in the situation. The doubt or confusion is in the situation and not in us. Doubt that is merely personal and "not relative to some existential situation" is pathological. (10: 106).

The indeterminate situation institutes (or constitutes) a problem. The situation as such is precognitive. The recognition

or judgment of a situation as problematical is the first step of inquiry, and on my reading of Dewey's analysis the onset of cognition (10: 107). Thus inquiry is, to state it simplistically, essentially problem solving. However, Dewey's conception is very complex, not at all simplistic, and the name--'problem solving'--may be misleading.

3.4 The function of inquiry on the indeterminate situation is judgment, or determination or resolution, that establishes the "objectively unified existential situation." This judgment is only a warranted assertion, dependent on the objective situation. The predicational (i.e., conceptual and rational) content of judgments are hypotheses; "in their more comprehensive forms they are theories" (10: 132). The transactional, situational character of inquiry and judgment "entail the conclusion that all knowledge as grounded assertion involves mediation" (10: 139). The mediating functions in warranted assertion are inference, and rational discourse.

3.41 Dewey's early conception of inference is fairly traditional: induction is inferential, as distinguished from deduction, which involves proof. Induction "aims at pushing out the frontiers of knowledge" (8: 209f). This contention contrasts with Peirce's characterization of inference, though in the same volume Dewey seems to assume some similarity between his conception and Peirce's. The similarity seems to consist principally in their both taking inference as a mediating function.

3.42 In the later Logic Dewey gives a stronger characterization of inference as mediating; inference does not, he held, exhaust logical functions or determine exclusively all logical forms, even if proof, "in the sense of test," is taken in connection. The resolution of indeterminateness consists in the satisfaction of an end-in-view; to this inference is subordinate, "a necessary but not a sufficient condition of warranted assertion." (10: 157f)

Dewey also makes a strong distinction between inference and "reasoning as ordered discourse. . . . the movement of inference cannot be identified with that of rational discourse without radical doctrinal confusion" (10: 277). The movement of inference is guided by generic proposition--distinctions of kind. The movement of discourse is guided by universal propositions--distinctions of operations. The relation between generic and universal propositions is conjugate, thus, "no grounded generic propositions can be formed save as they are the products of the performance of operations indicated as possible by universal propositions" (10: 275).

Inference consists in the discrimination and conjunction of qualities determining kind, of what conditions are related and how. Discourse is concerned with the derivation of implicatory relations. Inference is concerned with existential "involvement," discourse with "logical implication" (10: 279). "The functional correspondence . . . [of] generic and universal propositions, signifies . . . that they represent cooperative division of function in the inquiry which transforms a problematic situation into a resolved and unified one." Inference and discourse are the intermediary, cooperative phases of inquiry. (10: 280)

Thus we could interpolate into the definition of inquiry above (p. 17) that it is "transformation of an indeterminate situation . . . controlled and directed" cooperatively by the existential determination of inference and the implicative determination of rational discourse.

3.5 The distinction Dewey made between inference and discourse, between existential and implicative relations, makes sign theory an important consideration for him. He gave an example in the Logic: A person convicted in a court of law as a criminal accomplice "is [one] so involved with the principals as to be involved in the consequences of the crime"--an existential relation. But the involvement of the convicted accomplice in penal consequences, in specifically retributive consequences, "results only because of the definitions of 'crime,' 'principal,' and 'accomplice' instituted in a given legal [conceptual] system" --an implicative relation. The implicative propositions of the legal system determine whether a given instance of behavior is criminal, and whether that of principal or accomplice, with respect to specific retributive consequences. (10: 279f)

The criminal-legal example is an apt illustration for Dewey's conception of signs. From the early Essays to the late Logic and Knowing, Dewey's conception of signs is closely tied to the notion of constituting evidence, of the whatever-it-is of experience constituting evidence for existential inferences and of implicative relations.

3.51 In the early development of Dewey's sign conception, the notion of constituting evidence was uppermost. For example, in the index of the Essays, 'sign' is referenced to 'evidence' and 'symbol' does not appear. At the sites indexed under 'evidence' one finds the discussion turning principally on the meanings of'sign,' 'symbol,' and 'perception' (8: 36, 39ff, 226, 260, 392, 403), and 'evidence' is cross-referenced to 'inference.' The discussion generally bears clearly the pragmatic stamp.

The conception in the Logic of sign and related notions is more rigorously developed than in the Essays. In the later work the distinction of 'sign' and 'symbol' is early made quite explicit. Dewey said, "I prefer to mark the difference by confining the application of sign to so-called 'natural signs'--employing symbol to designate 'artificial signs'" (10: 51). The representation of a sign consists in the significance of its "observed qualities," that of a symbol in its "meaning carried by language in a system." Or to put the distinction more strictly, the representative function of a sign is its significance, that of a symbol its meaning (10: 53). The perception of smoke signals one's attention to the combustion of which the smoke is a product. The perception of 'smoke' signals one's attention to the perception of smoke, or to light his pipe. The illustration, paraphrased from Dewey, is overly simple, but underscores the distinction adequately.

The point is that signs and symbols relate to different modes of behavior. Signs "are evidence of the existence of something else, this something being at the time inferred rather than observed." Symbols are the objective content of "ordered discourse or reasoning . . . . Ideas as ideas, hypotheses as hypotheses, would not exist were it not for symbols and meanings as distinct from signs and significances." (10: 52f)

3.52 The nature or manner of relation is specified, in the Logic, "to deal with the ambiguity of the word as it is used not merely in ordinary speech but in logical texts." Symbols relate to symbols directly, to existence through the mediation of "existential operations." Existences are related "in the evidential sign-signified function." Dewey proposed to reserve 'relation' to the interaction of symbol-meanings; he nominated 'reference' to designate the relations of symbols to existence, and "connection (and involvement) to designate that kind of relation sustained by things to one another in virtue of which inference is possible." (10: 54f)

3.53 Dewey's final formulation of his conception of knowledge appears in Knowing and the Known (11), written with Arthur F. Bentley, published in 1949, three years before Dewey died. This last work carries forward the conceptions formulated in the Essays (8) and in the Logic (10), now elaborated in an analytical critique of the language used to express conceptions of the knowledge process. The key block of this structure is the transactional concept.

> The transactional is in fact the point of view which systematically proceeds upon the ground that knowing is co-operative and as such is integral with communication. . . . It

> treats knowledge as itself inquiry--as a goal within inquiry, not as a terminus outside or beyond inquiry (11: vi).

On the transactional view, knowing and knowns are inseperable, except for the explicit purposes of analysis; they are "twin aspects of common fact" (11: 53). And fact is "the cosmos . . . being known through naming by organisms, themselves among its phases" (11: 294). Fact is knowings-knowns, as distinguished from alleged independent reals or merely mental reports.

Fact may be analytically distinguished as event--the form of the known--and designation--the form of knowing. But a designation is itself an event, and an event is designational. The circularity here is explicitly accepted--indeed, insisted upon--by Dewey and Bentley, as essential to explaining "world-being-known-to-man-in-it" (11: 63).

The concept of designation, as elaborated by Dewey and Bentley, is a sign theory, "an evolutionary scheme of behavioral sign processes" (11: 64), in which 'behavior' is taken "to cover all adjustmental activities of organism-environment, without limiting the word . . . to overt outcomes of physical or physiological processes" (11: 149). The word 'sign' is applied to "the entire range of behavioral activity," distinguished from physiological activity. Sign activity is distinguished as signal, name (or designation), and symbol. Signal is the minimal level of the evolution of sign activity, the level of"perceptions, manipulations, habituations, adaptations, etc. . . . (adapting the word from Pavlov's frequent usage)." Name is the level of "organized language . . . employed as sign." Symbol is "an advance beyond naming," "a later linguistic development of sign, forfeiting specific designatory applications to gain heightened efficiency in other ways"--as in mathematical language. (11: 71-74, 303)

Name, or designation, is further distinguished, in an ascending hierarchy of specificity, as cue, characterization, and specification. Cue is "the most primitive language behavior," minimally communicative in contrast with signal, including cries, expletives, interjections, "or other casually practical communicative convenience." (11: 156f).

Characterization is the principal linguistic form of sign, developed out of the clustering of cues--"i.e., through the growth of language." Characterization "makes up almost all of our daily conversation"; it is ordinary language. Specification is the further refinement of language "that develops when inquiry gets down to close hard work"; it is namings appropriate for the purposes of research. (11: 159, 162) Specification presents "the scientific object . . . that which exists"(11: 165).

3.6 In sum, Dewey's matured conception of knowledge could be called a special sort of behavioral nominalism (without intending to stretch those terms too far), a behavioral nominalism dependent on the transactional concept with its two-factored reciprocal relation, and further qualified by the explicit rejection (11: 94) of "All 'minds' as bearers of knowledge."

Dewey's experimentalist epistemology, at least to the extent that it is fairly represented in the Logic and the Knowing, is far removed from the critical commonsensist basis of Peirce's pragmatism. I will now turn to a brief comparative appraisal of the pragmatic and experimentalist concepts.

4. AN APPRAISAL

4.1 Charles Peirce graduated from Harvard University in 1859, the year of John Dewey's birth. Separated in time by nearly a generation, these two thinkers are further separated in thought, despite their commonalities, by significant differences in the foundations of their philosophic positions. If a man's thought can be fairly said to bear the stamp of a single philosophical antecedent, then by explicit admission Peirce is descended from Kant, Dewey from Hegel. This descent may account for, in considerable part, the realism of Peirce's critical commonsensism and the "idealism" of Dewey's transactionalism.

This difference in the foundations of their positions, and the specific character of the difference, implies the differences of particular conceptions which follow, so to speak, from the foundational assumptions. Thus, on each of the principal conceptual elements of their epistemologies, Peirce and Dewey display a characteristic difference of formulation.

4.11 A critical difference is Dewey's transactionalism, and his insistence that interaction concepts are inherently misleading. Dewey--and his explicator, Geiger--employ unarguably transactional examples to exhibit the transactional concept. Thus, Geiger claims that 'interaction' begs the question, "for it assumes that some things have indeed been set apart, the problem now being to put them together again" (15: 16). But a slight alteration of the statement can shift its focus considerably: An interaction concept assumes that some things are discriminable, the problem being to explain their connections and relations--e.g., in the case of the knower and the known. The altered statement has the virtue of <u>not</u> assuming that the relation is reciprocal. Thus, we need not <u>presume</u> any mutual or reciprocal effects in, say, the case of one's perceiving a stone. To take a specific example from Dewey (11: 133), consider the case of the hunter, the hunted, and the hunting. Dewey is correct, no doubt, in seeing this case as transactional--<u>for most instances</u> -- since the analytically distinguishable terms are interdefined, and in (most) actual cases the effects are certainly reciprocal. But what of the hunter of unicorns? I think the transactional analysis, as Dewey gives it, cannot handle this case.

The principal disadvantage of the transactional concept is displayed in the event in which one or more elements of the subject-relation-object triad is illusory, imaginary, or symbolic. The transactional concept has considerable merit to the extent that it draws attention to the reciprocity of effect in <u>much</u> of our experience, particularly of interpersonal or social experience.

But I submit that to generalize the transactional to all experience, or more particularly to all knowing, is more misleading than is the alleged (or actual) ambiguity of the interaction concept. Dewey seems to merely rule out the possibility of rendering the interaction concept precise, without in fact exhausting the alternative means to that goal.

Peirce's pragmatism does not encounter the transactional problem; he is content with the interaction concept, though not without noting the importance of reciprocity of effect in a substantial portion of knowing. Certainly his notion of the community of knowers (see, e.g., 5.311) encompasses the transaction concept in an important respect, as does his characterization of person and society (5.421). Being commonsensist in his assumptions, Peirce takes the knower as epistemologically primary. Dewey makes relation primary, as his explicit rejection of mind postulates shows (11: 56, 94, et passim). Peirce characterizes society as "a sort of loosely compacted person, in some respects of higher rank than the person of an individual organism" (5.421, italics added). Dewey rejects the concept: ". . . a derivation of the [individual] from the [social] would . . . be much simpler and more natural than an attempt to produce a social by joining or otherwise organizing presumptive individuals" (11: 142). Yet, as Peirce noted (5.52ff), one of our firmest perceptual judgments is "a double consciousness at once of an ego and a non-ego, directly acting upon each other." Here the watershed summit between pragmatism and experimentalism is clear (though one must admit that the implications of the distinction are not everywhere realized either in Dewey or Peirce).

4.2 This divergence on the primacy of the individual constrains Peirce's and Dewey conceptions of experience. Pragmatism is at base a theoretical explanation of the derivation of meanings by individuals and aggregates or communities of individuals. Peirce's conception of experience is a commonsensist explication of the contribution of experience to meanings, and thus to belief. He explicitly limits the pragmatic theoretical formulation to "intellectual concepts." Dewey rejects the word 'meaning' as "so confused that it is best never used at all" (11: 297). For Peirce experience is "just that of a cognitive nature which the history of our lives has forced upon us" (5.539). Dewey would apply the word 'experience' "when a name is wanted to emphasize the inter-connectedness of all concerns, affairs, pursuits, etc. . . . ." (11: 286). Additionally, Dewey imposes an "estnetic" criterion on an experience--a distinction Peirce does not make within the pragmatism proper.

4.3 With respect to the conception of inquiry, Dewey acknowledges his debt to Peirce in the realm of logical

formulations (10: 9), but the theoretical differences are perhaps more critical than the similarities. Dewey finally arrived at the position that 'inquiry' is the proper (i.e., appropriate) name for knowing, a position foreshadowed though not explicit in his early writings. Peirce precisely distinguished between the process of inquiry and its outcome in belief. Dewey placed the origin of inquiry in the problematic situation. Peirce saw doubt as the stimulus to inquiry. At this level the two conceptions are not radically different; the differences are subtle. For example, Peirce held that belief--the resolution of doubt--can be attained, and often is, by non-pragmatic and largely non-systematic means. For Dewey, the resolution of the problematic situation is either a (presently) warranted assertion or an appropriate behavior or, of course, both of these. For Peirce, the resolution of doubt is belief, "whether the belief be true or false" (5.375).

4.4 A further divergence between pragmatism and experimentalism appears in the conception of inference. Peirce constructed pragmatism in part as a method for determining the admissibility of hypotheses; the case rests principally on the concept of abduction and its intimate relations to deduction and induction as, respectively, systematic and experiential tests on hypotheses. The abductive concept does not appear in Dewey's work; he speaks of the "hypothetical-deductive" stage of inquiry as intermediate with respect to "the initial and terminal stages [of inquiry] . . . (concerned with existential observations)"--which stages he appears to characterize as inductive (10: 427f).

While both Peirce and Dewey conceive inference as a mediating function, the intent of the two conceptions seems radically different. Peirce's account of inference, as Gallie comments (14: 108), is not in the strict sense a description of thought. Peirce attempted to explain the nature of thought by means of a conceptual analysis of the expression of thought, its public aspect--thus his contention that "all thought whatsoever is a sign, and is mostly of the nature of language" (5.421). Dewey's conception of inference subserves his unique "nominalism," the knowing-naming concept (most noticeably in the sign theory), in a manner that leads me to conclude that he "ontologizes" naming, or perhaps more accurately, "nominalizes" ontology. Neither position is understood fully, nor is the contrast of them, without taking into account the sign theory.

4.5 The summaries of Peirce's and Dewey's sign theories (sec. 2.5, 3.5) may give the impression that Dewey's is the more elaborate. The contrary is the case; Peirce's fully elaborated theory of signs is enormously complex--perhaps unnecessarily so. But the aspects of Peirce's scheme crucial to the understanding

of pragmatism are not bound to the fully elaborated theory. Dewey's sign theory, as given in the Knowing, is, relative to Peirce's, compact. But it is all of a piece; e.g., the elaboration of designation is crucial, because in Dewey's theoretical structure event and designation are only aspects of the same thing.

Where for Peirce reality is the independent "non-ego" something about which we come by various means to have beliefs, for Dewey (though he would not use the word 'reality') it is the "event-designation." Thus, Peirce's sign theory is independent of ontology; Dewey's is not.

4.51 Peirce's primary intent in the sign theory is to formulate a logical differentia of sign-behavior, principally human sign-behavior. This concept precisely distinguishes functionally between sign and signficate, a distinction Dewey confuses by his insistence that event and designation are aspects of the same thing only analytically distinguishable.

Though Dewey's signal, name, and symbol bear superficial resemblance to Peirce's icon, index, and symbol, Dewey's theory does not recognize the power of Peirce's concept of the triadic structure of signs, though the latter is clearly a conceptualization of the form of knowing, which Dewey claimed his designation-sign concept also to be. This oversight in Dewey's theory surely follows from his holding that event (object, in Peirce's scheme) is only analytically distinguishable from event-designation taken together as fact. Peirce's scheme has at least the virtue of allowing a perceptual judgment on an event for which the observer has yet no sign--i.e., no cognitive equivalent. And this criticism suggests a further and significant weakness in Dewey's argument.

If event-designation are formal equivalents, and on Dewey's account, I take it, virtually simultaneous, I am hard put to see how an abductive hypothesis--which, significantly, predicts an event--can be derived. Yet Peirce's account of abduction is a conceptualization of behavior that does in fact occur.

4.6 In short, I submit that Peirce's conception, whether wholly supportable or not, does comprise the behavior we usually subsume under the term 'knowledge'; in an important respect Dewey's conception does not. Any minimally adequate epistemology must at least account for the three levels of inference and their relation that Peirce identified--within some scheme, not necessarily Peirce's--and must either not do violence to our common cognitions of cognition or clearly explain why the violence is done, as in Peirce's explanation of the triadic structure of signs.

Dewey has either begged the question or failed to recognize it. At least, his transactional concept, applied strictly as he does, does violence to our common cognition of the status of knower and known without satisfactorily, to this reader, explaining why the violence was done.

5. PRAGMATISM AND EDUCATIONAL THEORY

5.1 As must be evident now to the reader, Dewey's role in this study has been uncomfortably near that of straw man. This was my intent, for reasons given in the introduction; i.e., Dewey did influence American educational theory significantly, and the principal sources of influence from his philosophical position were derived from Peirce. The question now remains, what are the implications of pragmatism for educational theory? Or to put the question more accurately, what likely fruitful relation can one discern between pragmatism and educational theory? An answer can only be sketched here. The answer comprises the relation of certain central aspects of the pragmatic conception of knowing to the conception of education, and the relation of one corollary of the pragmatic view to some recent and current developments in psychology that can contribute to educational theory.

5.2 We can generally agree that, at least in open societies, education at one or more of its levels performs three principal functions: cultural conservation, development of individual learning skills and knowledge, and development of new knowledge which (mostly) has innovative consequences for society. That last phrase is a deliberate hedge against entering here the argument whether education properly plays a <u>direct</u> innovative role in social evolution.

5.21 To the extent that the above listed are central functions, whether explicitly or implicitly, education is a central function of social evolution. One can then ask whether an evolutionary conception of the behavioral processes comprised by education might be a fruitful approach to the conception of education. I have in mind a social analogue of Darwinian and post-Darwinian conceptions of physical evolution. The approach is not original, as Campbell's paper (3) on Popper's evolutionary epistemology shows. Campbell comments on the Lamarkian evolutionary concept which he seems to take as imbedded in pragmatism (3: 39ff). I would suggest that the Lamarkian concept is <u>attached</u> to Peirce's scheme, but not necessarily imbedded in it. That is, the "tendency to habit" can be read as an epistemological principle, without metaphysical or cosmological intent, in which case Campbell's charge of anthropomorphism is irrelevant, his charge of mentalism only a theoretical bias.

We can take Peirce's own contention that the pragmatic concept is primarily a conceptual model of the knowing process, without also committing ourselves to any <u>particular</u> metaphysical or ontological assumptions, nor to any particular descriptive

theory. We are then in a position that at least has the virtue of not violating our commonsense epistemology in advance of any justification for doing so. The pragmatic notions of belief, doubt, and habit are immediately accessible for those further deductive and inductive derivations which Peirce said must follow from any admissible hypothesis.

5.22 Of course, merely not begging the questions is not a sufficient recommendation for an epistemological model, though it is necessary to a serviceable model. Pragmatism can be recommended on the ground that a consequence or corollary of the concept--a consistency concept--is concordant in many respects with fruitful hypotheses and experimentation in another field, psychology.

5.3 To add to the assumptions operating here, I propose that the field of investigation most productive of concepts useful in the development of educational theory is psychology. I do not think documentation is necessary. Variations of behaviorism have largely dominated American educational psychology for several decades, but the focus was shifting by the time Tolman's collected papers (27) were published in 1951, and had markedly shifted a decade later toward a cognitive emphasis. The now strong cognitive approach is in many respects an experimental equivalent of Peirce's conceptual approach: e.g., Mowrer's concern with symbolic processes (22).

5.31 The concept of habit as a rule of action depends on the accumulation of experience, perceptual judgments, and cognitions that are mutually effective and concordant. Thus, Peirce could say, ". . . the identity of a man consists in the consistency of what he does and thinks . . . ." (5.315). And this contention is based on a characterization of consciousness, "sometimes used to signify the I think, or unity in thought; but the unity is nothing but consistency, or the recognition of it" (5.313). If belief is the recognition of consistencies, then doubt is the recognition of inconsistencies. This conception would seem to bear some relation to psychological cognitive consistency theories developed in the past two decades.

5.32 McQuire, in his survey of consistency theories, characterizes them as having "in common the notion that the person tends to behave in ways that minimize the internal inconsistency among his interpersonal relations, among his intrapersonal cognitions, or among his beliefs, feelings, and actions" (20: 1). This characterization is distinctly reminiscent, if only very generally, of Peirce's development of the concept of belief. If, for example, one were to set out to extract from Peirce's work a definition of rationality--a not unreasonable task--he might

very well derive a statement strikingly similar to McQuire's characterization of consistency theories. To the extent that this contention is valid, we have in pragmatism a philosophical or conceptual equivalent of a very productive area of psychological theory. McQuire notes of consistency theories, ". . . they seem to us to furnish the theoretical point of departure for more personality and social psychological research than does any other one theoretical notion" (20: 2). McQuire suggests (20: 41ff) that consistency notions best fit into current psychological thinking at the level of motivational functions, a behavioral area very likely crucial to the development of educational theory.

5.4 Many philosophers of education now hold that our appropriate role with respect to educational theory is that of the critical analyst who surveys the conceptual bases of theory for "fit" or consistency among the theoretical concepts and between theory and educational functions. If the pragmatic epistemology is a philosophical equivalent of experimental theories potentially fruitful for the derivation of educational theory, the philosopher of education has at hand a potentially strong tool for the necessary epistemological assessment of the fit between educational theory and its behavioral scientific correlates.

6. IN SUM

6.1 The intent of this study--now, I hope, both apparent and modestly successful--is to assess the potential fruitfulness of employing a pragmatism directly derived from Peirce as a principal tool of educational philosophy.

6.2 To this end I have summarized the principal epistemological concepts of pragmatism and of its offspring, Dewey's experimentalism. And I have appraised briefly the major differences of Peirce's seminal theory and Dewey's adaptations, which have been influential on educational theory.

6.3 I have sketched the principal dimensions of the possible ground for taking pragmatism as a primary critical tool for educational philosophy. I assume that I have not completed a task, but exhibited how it might be begun. The posited concordance of pragmatism and cognitive consistency notions is illustrative only of several dimensions along which a continuing study might proceed. As for all properly conceived philosophical inquiries, and in the spirit of pragmatism, I claim for this study only suggestive, not conclusive, power.

7. REFERENCES

1. Bernstein, Richard J. (ed.). Perspectives on Peirce. New Haven: Yale University Press, 1965.

2. Buchler, Justus (ed.). Philosophical Writings of Peirce. New York: Dover Publications, Inc., 1955.

3. Campbell, Donald T. "Evolutionary Epistemology." Unpublished paper. Stanford, California, 1966.

4. Cohen, Morris R. American Thought: A Critical Sketch. Glencoe, Illinois: The Free Press, 1954.

5. Cremin, Lawrence A. The Transformation of the School. New York: Alfred A. Knopf, Inc., 1962.

6. Dewey, John. Art as Experience. New York: G. P. Putnam's Sons, Capricorn Books, 1958.

7. _____. Democracy and Education. New York: The Macmillan Company, 1916; paperback edition, 1961.

8. _____. Essays in Experimental Logic. New York: Dover Publications, Inc., nd.

9. _____. Experience and Nature. Second edition. New York: Dover Publications, Inc., 1958.

10. _____. Logic: The Theory of Inquiry. New York: Holt, Rinehart and Winston, Inc., 1938.

11. _____, and Arthur F. Bentley. Knowing and the Known. Boston: The Beacon Press, 1949.

12. Dworkin, Martin S. (ed.). Dewey on Education. New York: Bureau of Publications, Teachers College, Columbia University, 1959.

13. Fodor, J. A. "Could There Be a Theory of Perception," The Journal of Philosophy, LXIII (June 23, 1966), 369-380.

14. Gallie, W. B. Peirce and Pragmatism. Harmondsworth, Middlesex, England: Penguin Books Ltd., 1952.

15. Geiger, George R. John Dewey in Perspective. New York: Oxford University Press, 1958; McGraw-Hill Book Company, paperback edition, 1964.

16. Jaeger, Werner. Paideia: the Ideals of Greek Culture. Oxford: Basil Blackwell, 1939.

17. Maccia, G. S. "The Educational Aims of Charles Peirce," Educational Theory, IV (July, 1954), 206-212.

18. _____. "A Comparison of the Educational Aims of Charles Peirce and John Dewey," Educational Theory, IV (October, 1954), 289-296.

19. _____. "The Peircean School," Educational Theory, V (January, 1955), 29-33.

20. McQuire, William J. "The Current Status of Cognitive Consistency Theories," The Consistency Postulate in Social Attitudes and Behavior, S. Feldman, editor. In press, 1966.

21. Moore, Edward C., and Richard S. Robin (eds.). Studies in the Philosophy of Charles Sanders Peirce. Second series. Amherst: The University of Massachusetts Press, 1964.

22. Mowrer, O. H. Learning Theory and the Symbolic Processes. New York: John Wiley and Sons, Inc., 1960.

23. Peirce, Charles Sanders. The Collected Papers of Charles Sanders Peirce. 8 vols. Vols. I-VI, ed. Charles Hartshorne and Paul Weiss; vols. VII, VIII, ed. A. W. Burks. Cambridge, Massachusetts: The Belknap Press of Harvard University Press, 1960, 1966.

24. Reid, Louis Arnaud. Philosophy and Education. New York: Random House, Inc., 1965.

25. Russell, Bertrand. The Problems of Philosophy. New York: Oxford University Press, 1958.

26. Scheffler, Israel. Conditions of Knowledge. Chicago: Scott, Foresman and Company, 1965.

27. Tolman, Edward Chace. Behavior and Psychological Man. Berkeley and Los Angeles: University of California Press, 1961.

28. Wiener, Philip P., and Frederic H. Young (eds.). Studies in the Philosophy of Charles Sanders Peirce. Cambridge, Massachusetts: Harvard University Press, 1952.

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